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ABSTRACT

A study analyzed the effects of classwide peer tutoring on science vocabulary spelling achievement for three language groups in one school's sixth grade. The groups consisted of: (1) Spanish-dominant and limited-English-proficient (LEP) students (n=8); (2) students proficient at grade level in both Spanish and English (n=14); and (3) monolingual English speakers (n=5). For comparison of weekly spelling gains, the second and third groups were combined as one non-LEP group. Experimental stimuli were drawn from the sixth-grade science text. Results of weekly spelling pre- and post-tests demonstrated that the peer tutoring procedures resulted in gain scores for the three language groups. In addition, the Spanish-dominant LEP group made greater gains when compared to the non-LEP group. Implications for the design and implementation of peer tutoring programs for LEP students are discussed. An 11-item bibliography is included. (Author/MSE)

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ECOBEHAVIORAL VARIABLES WITHIN A CLASSROOM WITH LIMITED ENGLISH PROFICIENT STUDENTS

Gene T. Chavez and Carmen Arreaga-Mayer

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This study provided an analysis of the effects of classwide peer tutoring on science vocabulary spelling for three language groups. The three groups were: a) Sixth graders who were Spanish language dominant and limited English proficient (LEP) students; b) Students who were proficient at grade level in both Spanish and English; and c) monolingual English speakers. For the comparative analysis of weekly spelling gains, groups B and C were combined to form what was called the non- limited English proficient (students were identified by the use of the Language Assessment Scales ,LAS). All participants were sixth grade students at a midwestern urban elementary school. The experimental stimuli were drawn from the six grade science text. The results of pre and post weekly spelling tests demonstrated that the peer tutoring procedures resulted in gain scores for the three language groups. In addition, the Spanish dominant limited English proficient group made the greater gains when compared to the non-LEP group. These findings are discussed in terms of their implications for the design and implementation of peer tutoring programs for limited English proficient students.

Behavior observation has been called the "hallmark" of applied behavior analysis (Ciminero, Calhoun, & Adams, 1977). Hartmann and Wood (1982) stated that direct observation is an important behavioral assessment technique and reported that over 70% of the research articles published in major behavioral journals make use of direct observation procedures. Williams (1974, 1977) asserted that there were relationships between persons and proximate and distal environments that transcended traditional behavioral analyses of response-consequence interactions. In fact, it was Williams (1977) that urged a "marriage" of the methodologies of ecology and behavior analysis to create a new science of "ecobehaviorism" with the goal of finding, measuring, and testing for these multiple interactions, as well as bringing to light "ripple effects", and avoiding possible unintended negative effects in treatment.

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The purpose of the comprehensive research, of which this study is a part, was to quantitatively observe, record and analyze ecobehavioral variables within a classroom containing a number of limited English proficient (LEP) Mexican immigrant sixth grade students. This study provided analysis of the effects of a selected variable: classwide peer tutoring. The students were involved in a classwide peer tutoring program

for science vocabulary words spelling. Before recommendations for improving instructional procedures among these students were offered to inner city school district personnel, where these students had recently begun school, variables affecting their learning were explored.

Based upon the major research, attention was given to some of the special educational needs of the LEP students in the sixth grade classroom. Special attention was given to these five areas:

1. Monitoring, controlling, and coordinating the amounts of academic responding for culturally and linguistically different learners (Arreaga-Mayer, 1986).

2. Examination of the culturally induced behaviors that diverse LEP students bring with them to the classroom (Maheady, 1985).

3. The need to go beyond the "medical model" approach used to measure success in school which most generally assumes that something is wrong with the culturally different student (Ysseldyke & Algozzine, 1984).

4. The need to investigate second language acquisition among LEP students within what Saville-Troike (1983) called the context of the cultural content within the educational environment.

5. A context-specific approach which examines the actual process of the interaction between individual LEP students and their learning environments with the classroom (Diaz, Moll, and Mehan, 1986; Greenwood, Arreaga-Mayer & Clark-Preston, 1985).

The specific research questions included in the study were:

1. What were the levels of academic responding during bilingual (Spanish/English) tutoring sessions as compared with English only tutoring sessions?

2. Were bilingual tutoring methods used on designated bilingual tutoring sessions more effective for teaching science vocabulary than the methods used in non-bilingual tutoring sessions?

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Methodology

Subjects.

The sample consisted of 27 students (14 bilingual: English/Spanish); 8 monolingual(Spanish); and 5 monolingual (English). There were 12 males and 15 females in the sample (6 males and 8 females/bilingual; 2 males and 3 females/monolingual- English; 4 males and 4 females/monolingual-Spanish).

All of the bilingual and monolingual/Spanish speaking students were of Mexican descent. Of the five monolingual/English, 3 were Black and 2 were Anglo. All the students were enrolled at the sixth grade level in an inner city midwestern urban school. The eight monolingual/Spanish students participated in a bilingual pull-out program for LEP students at the school.

Procedures

Sixth grade students who were limited English proficient as measured by the Language Assessment Scale (LAS) and their monolingual English speaking peers were trained to participate in a Classwide Peer Tutoring program developed at the Juniper Gardens Children's Project in Kansas City, Kansas (Stanley & Greenwood, 1981). The program was designed to teach the spelling of science vocabulary words. The experimental stimuli (science vocabulary words) were drawn from the sixth grade science text using a different list of 20 words each week. Weekly measures of spelling gains were gathered by use of pre and posttests.

It was hypothesized that the students who were LEP would demonstrate greater gains from pretests to posttests as a result of the tutoring experience (independent variable), especially if they were given an opportunity to use the Spanish language if they desired. During alternating weeks students were permitted to use Spanish to instruct, spell, correct, and/or communicate with their peer in the tutoring dyad (language preference condition-LP). The study was conducted over eight weeks using an alternating treatment design, where the all English tutoring condition (E) was followed by the language preference condition (condition-LP). During the condition-LP tutoring weeks students were encouraged to use Spanish.

Treatment Design

Wk.1	Wk.2	Wk.3	Wk.4	Wk.5	Wk.6	Wk.7	Wk.8	Wk.9
*TR.	**E	***LP	E	LP	E	LP	E	LP

*Tr. = Training Teacher & Students
**E = English Only Tutoring
***LP = Language Preference (Spanish/English) Tutoring Allowed

Findings

Children in both the LP and E weeks showed significant gains in science word spelling improvement due to the tutoring experience. Limited English proficient students, as was hypothesized, showed slightly greater gains, during the LP weeks when the language preference condition was implemented.

Figure 1 (see page 90) shows that during the eight weeks of tutoring, correct academic responding increased from a group mean of 29% correct science spelling words across pretests to a group mean of 92% correct across posttests. Tables 1 and 2 show the gain effects observed for all students within the different tutoring conditions.

An analysis of the specific gain effects by independent groups and conditions can be found on Table 1.

Table 1

Mean percentage gains from Pre-test to Posttest for LEP vs. NON-LEP students.

Group	W1-E	W2-LP	W3-E	W4-LP	W5-E	W6-LP*	W7-E	W8-LP
LEP	55%	66%	73%	70%	84%	69%	81%	84%
NON-LEP	27%	41%	51%	67%	76%	68%	64%	63%

*Week 6 as an irregular week for data collection - percentages represent only 3 days of tutoring versus the regular 5 days of tutoring intervention.

Table 2

Percentage of Weekly Science Vocabulary Spellin Gains from Pre-Test to Posttest

	E WEEK 1		LP WEEK 2		E WEEK 3		LP WEEK 4	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Total Group	57	98	41	84	33	94	20	88
LEP Group	43	98	39	98	23	96	16	86
Non-LEP Group	66	94	41	82	41	92	22	89

	E WEEK 5		LP WEEK 6		E WEEK 7		LP WEEK 8	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Total Group	16	95	21	91	25	92	20	93
LEP Group	9	93	20	89	15	96	8	92
Non-LEP Group	21	97	24	92	32	96	28	90

LEP = LIMITED ENGLISH PROFICIENT

NON-LEP = NON-LIMITED ENGLISH PROFICIENT

Figure 1
MEAN PERCENT CORRECT SCIENCE VOCABULARY WORDS

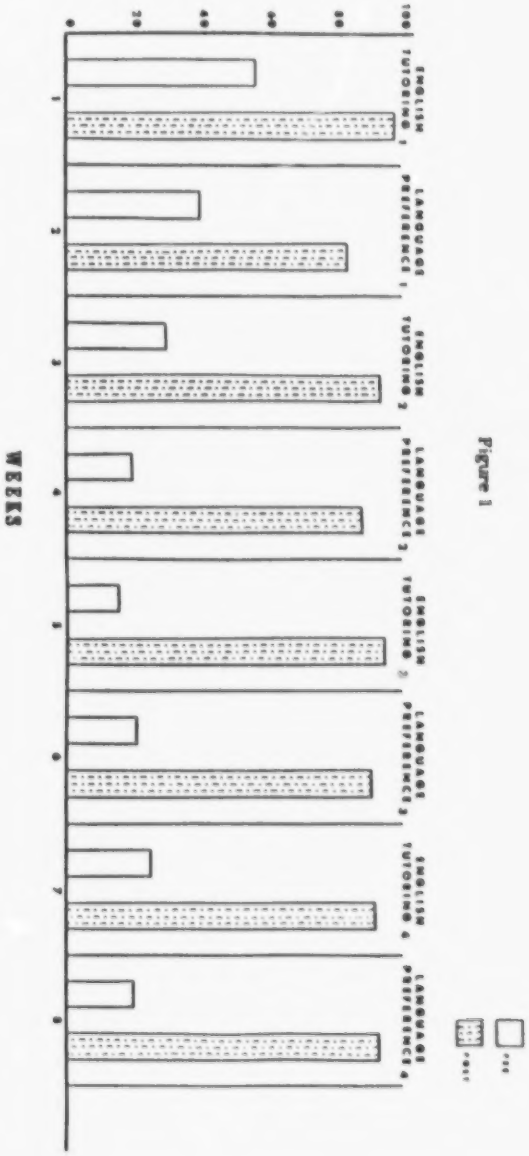


Figure 2
MEAN PERCENT GAIN FOR LEP AND NON-LEP STUDENTS

Figure 2 shows a comparison of the results for correct spelling gains for the limited English proficient (LEP) students and the non-limited English proficient students (non-LEP) during the eight weeks of the study. The LEP correct spelling words gains showed an increase from a total mean of 22% across pretests to 93% across posttests. The non-LEP correct spelling words gains showed an increase from a total mean of 34% across pretests to 92% across posttests.

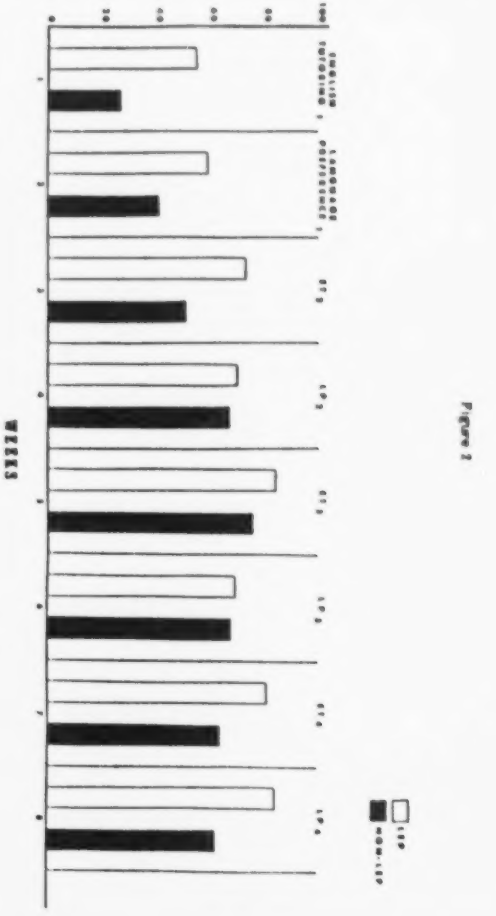
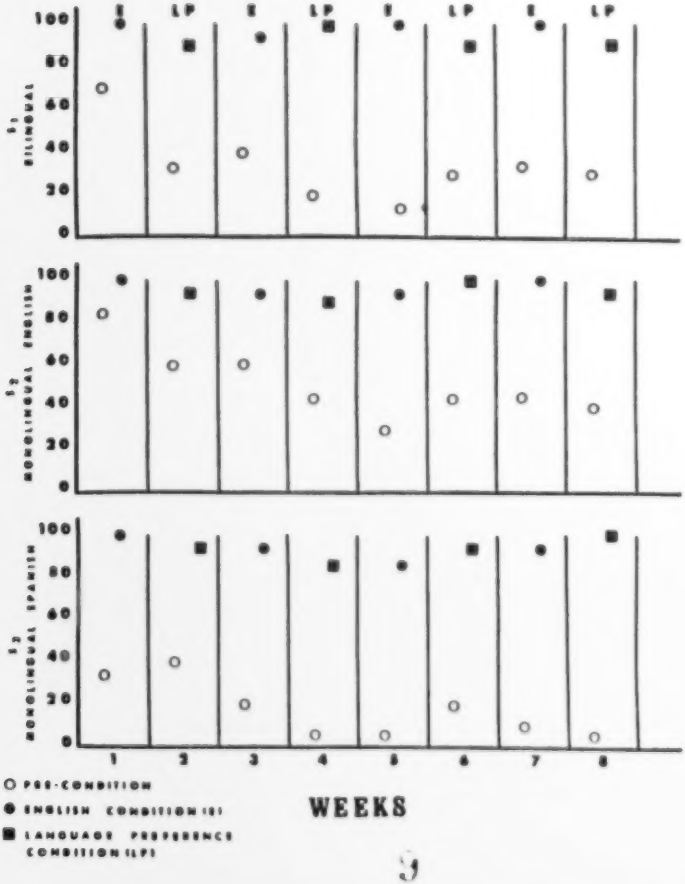


Figure 3
PERCENT CORRECT OF WEEKLY SCIENCE VOCABULARY TESTS

Figure 3 represents the individual achievement gains of three randomly selected students from each of the groups studied, that is, bilingual, monolingual/English, and monolingual/Spanish. The graphs represent the percentage of science vocabulary words correct on a weekly basis by conditions. In comparison, all groups showed spelling gains from 85% to 100% during weekly posttests. The bilingual and monolingual Spanish students represented the largest gains with the monolingual/English students showing the lowest gains of the three students.



Significance of The Study

Since a great deal has yet to be learned about the effectiveness of bilingual methods of instruction and since studies examining the ecobehavioral phenomena within bilingual classrooms are virtually nonexistent, this study provided a new way of looking at the effectiveness of a bilingual pedagogical method.

These findings, although limited in scope and in need of replication, strongly suggest that classwide peer tutoring results in greater academic gains for students. Specifically, the study validated that the effects of intervention changes in instructional contexts and student responding, as in the English condition vs. the language preference condition in peer tutoring, co-vary with achievement gains and support the validity of both approaches.

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